

REMARKS

Claims 1-4 and 7-17 are pending in the present application. Claims 7-14 are rejected. Claim 7 is herein amended. No new matter has been added.

Applicants' Response to Claim Rejections under 35 U.S.C. §103

Claims 7 and 8-14/7 were rejected under 35 U.S.C. §103(a) as being unpatentable over Konrad (U.S. Patent No. 5,789,167) in view of Wen-Teng et al. (U.S. Patent Application Publication No. 2001/0005718).

It is the position of the Office Action that Konrad discloses the invention as claimed, with the exception of disclosing that the electrodes are "bow-shaped." The Office Action relies on Wen-Teng to provide this teaching. Konrad is directed at a DNA analysis device including a first electrode 120 and a second electrode 130 mounted on planar support 110. As illustrated in Figure 1, Konrad also includes a region 140 of first electrode 120 to which an anchor sequence is attached. However, it appears that Konrad also suggests attaching the anchor sequence to the planar support 110 directly. See column 6, line 58 to column 7, line 16.

Konrad discloses providing an electric field between the first electrode 120 and second electrode 130. Column 15, lines 46-65. Konrad also discloses the use of a magnetic field at column 16, lines 46-67. However, the magnetic field is contemplated as an alternative to an electric field. Konrad does not disclose or suggest using an electric field and a magnetic field simultaneously.

In response, the Office Action states the “the reference discloses a device that can include either an electric field or magnetic field and as a result, one of ordinary skill in the art would have recognized that a device that generates both types of fields would be obvious such that a single device would be capable of providing either type of known field.” Although the Office Action does not identify the electric and magnetic fields as an intended use, the Office Action also notes that “statements of intended use carry no patentable weight in apparatus-type claims.”

In response, Applicants herein amend claim 7 in order to positively recite that the fields generated by the electrodes and magnetic field generating means simultaneously act on the biopolymers. This is supported at least by Figure 6. Applicants respectfully submit that Konrad does not disclose or suggest this. Even if it would have been obvious to modify Konrad to provide a single device which can generate electric and magnetic fields, there is no suggestion or motivation in Konrad that such electric and magnetic fields should be simultaneously generated. Since the electric and magnetic fields are alternate ways of extending an oligonucleotide sequence, there is no reason that one having ordinary skill in the art would be motivated to use both simultaneously. Furthermore, Applicants additionally amend the claims in order to recite that the electric field and the magnetic field are perpendicular to each other. However, in Konrad, it appears that the electric and magnetic fields are in the same direction as each other. This is supported at least by Figure 6. Applicants respectfully submit that such these amendments are sufficient to distinguish over the teachings of Konrad.

Additionally, the Office Action identifies Wen-Teng to teach “bow-shaped” electrodes. Wen-Teng is directed at an apparatus and process for rapid hybridization. Although not

illustrated, Wen-Teng discloses that “[t]he electrodes are flat or curved plates made by any conductive materials.” Paragraphs [0041] and [0053]. The Office Action broadly interprets this to read on the recitation of “bow-shaped” electrodes.

In response, Applicants respectfully submit that although Wen-Teng discloses flat or curved plates, Wen-Teng does not disclose or suggest that the electrodes are “bow-shaped backwards against said sites.” Wen-Teng merely states that the electrodes are curved plates without further details on their structure relative to a substrate. Thus, Applicants respectfully submit that Wen-Teng does not disclose or suggest electrodes that are bow-shaped backwards against the sites, as required by claim 7 and illustrated in Figure 7.

Furthermore, it would not have been obvious to have the electrodes “bow-shaped backwards against the sites.” If the electrodes are “bow-shaped backwards against the sites,” the distribution of the electric field can be concentrated in the sites, thereby improving the effectiveness of hybridization. The narrower the interval between the electrodes, the stronger the electric field. Wen-Teng contains no suggestion or disclosure of such a specific configuration of electrode or such a benefit. Therefore, for at least the above reasons, Applicants respectfully submit the combination of cited art does not disclose or suggest the invention as claimed.

Claims 7 and 8-14/7 were rejected under 35 U.S.C. §103(a) as being unpatentable over Chen et al. (U.S. Patent Application Publication No. 2003/0087292) in view of Wen-Teng et al. (U.S. Patent Application Publication No. 2001/0005718).

It is the position of the Office Action that Chen discloses the invention as claimed, with the exception of disclosing that the electrodes are “bow-shaped.” The Office Action relies on Wen-Teng to provide this teaching. Chen is directed at a hybridization apparatus utilizing Lorentz force. As illustrated in Figure 34 and discussed at paragraphs [0190] and [0191], the apparatus includes two electrodes, providing an electric field. The apparatus also includes two magnets (not illustrated), which provide a magnetic field perpendicular to the electric field. As a result, “the Lorentz force will push the target molecules to migrate towards the probes on the substrate surface.”

Chen discloses that upon application of the DC electric field and the alternating magnetic field, charged particles move vertically in a zigzag to be collected at one of the electrodes, followed by reversing the polarity of the DC electric field to cause the charged particle to move to the opposite electrode.

On the other hand, according to the present invention, the polarity of the electric field and the polarity of the magnetic field are synchronously switched over so as to cause a downward force to always act on the charged particles.

Additionally, Applicants reiterate the above comments with respect to Wen-Teng. Applicants respectfully submit that although Wen-Teng discloses flat or curved plates, Wen-Teng does not disclose or suggest that the electrodes are “bow-shaped backwards against said

sites.” Wen-Teng merely states that the electrodes are curved plates without further details on their structure relative to a substrate. Thus, Applicants respectfully submit that Wen-Teng does not disclose or suggest electrodes that are bow-shaped backwards against the sites, as required by claim 7 and illustrated in Figure 7.

Furthermore, it would not have been obvious to have the electrodes “bow-shaped backwards against the sites.” If the electrodes are “bow-shaped backwards against the sites,” the distribution of the electric field can be concentrated in the sites, thereby improving the effectiveness of hybridization. As the interval between the electrodes narrows, the electric field becomes stronger. Wen-Teng contains no suggestion or disclosure of such a specific configuration of electrode or such a benefit. Therefore, for at least the above reasons, Applicants respectfully submit the combination of cited art does not disclose or suggest the invention as claimed.

For at least the foregoing reasons, the claimed invention distinguishes over the cited art and defines patentable subject matter. Favorable reconsideration is earnestly solicited.

Should the Examiner deem that any further action by applicants would be desirable to place the application in condition for allowance, the Examiner is encouraged to telephone applicants’ undersigned attorney.

Amendment
Serial No. 10/730,061
Attorney Docket No. 032019

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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